R&D Networking and value Creation in SMEs

Nader Ale Ebrahim[1], Shamsuddin Ahmed and Zahari Taha,
Department of Engineering Design and Manufacture,
Faculty of Engineering, University of Malaya, Kuala Lumpur, Malaysia
[1]Phone: +60-17-3942458, Fax: +60-7967-5330, Email: aleebrahim@perdana.um.edu.my

Abstract: *Research and development (R&D) activities are fundamental drivers of value creation in today's technology-based Small and Medium enterprises (SMEs). Seemingly, a successful R&D is a task of innovation processes and development of R&D networks with allied companies. There is a perceived lack of understanding regarding the importance of SMEs and their need to continuously enhancing their technological capabilities for the purpose of establishing them in dominant market positions. This article presents R&D network issues from the perspective of their impact on value creation in SMEs. The fundamental trend to enable SMEs towards creation of new knowledge and diffuse in and transfer that to other SME's could be achieved by developing of collaborative environments and networks to increase their innovation capabilities as a single unit as well as the capabilities of the network as a whole through collective learning. SMEs seem to be the appropriate units to behave like network nodes because of their lean structure, adaptability to market evolution, active involvement of versatile human resources, ability to establish sub-contracting relations and good technological level for their products. SMEs not only shape the larger outcome, but also constrain actions of the state and MNCs in demand-responsive, buyer-driven networks. The objective of this article is the notice to creation of a network of SMEs that are geographically dispersed but virtually linked so that the participating members focus on their specialized tasks yet also share their knowledge and experience on resources to create an agile structured and flexible enterprise.*

Keywords: R&D, SMEs, Network, Value creation

Introduction

SMEs constitute one of the vibrant economic sectors that have a strong potential to accrue benefits from the advances in ICTs. For adapting in the changing business paradigms SMEs' survival mostly dependent on their ability to improve their performance and produce goods that could meet international standards (Gomez and Simpson, 2007). In other words, a certain level of competitiveness may be felt as a prerequisite for an SME's survival when dealing with dynamic business conditions. To compete with global struggle and overcome rapid technological changes as well as product varieties, SMEs must be able to accomplish product innovation (Laforet, 2007). (Dickson and Hadjimanolis, 1998) state that since small companies are typically lacking of some of the essential resources for innovation they have to acquire that from external sources, such as other companies, technical institutions, etc. Therefore, the

management of inter-organizational relationships and networking in general may be critical for the successful development innovation platform in small companies.

Research and development (R&D) outcomes may provide strength to any companies for furtherance of R&D activities. Implementation of outcomes can recognize new problems and give benefit through the feedback of experienced by the R&D companies. Particularly for SMEs with little R&D technology of their own, transfer is unavoidable. Knowledge supply is necessary in order to be able to develop and put innovations to market Research institutes have traditionally developed their own expertise through research and development work in areas that are supposed to have future strategic significance, without having a specified customer for the work being involved. They have also carried out problem-oriented research and development in collaboration with companies, universities and other research organizations and are commissioned to do research. In general terms, their work is based on existing knowledge that the institutes develop, refine and combine in new ways or apply to new situations and problems. The concept behind the institute is to convert research and development results into profits. One very important trend to enable new knowledge creation and transfer in and to SME's is the development of collaborative environments and networks to increase their innovation capabilities as a single unit but also the capabilities of the network as a whole through collective learning (Flores, 2006).

(Dickson and Hadjimanolis, 1998) examined innovation and networking among small manufacturing companies. They found some tentative evidence that companies operating in terms of “the local strategic network” are more innovative than those operating in terms of “the local self-sufficiency”. The typical Taiwanese production system is a cooperative network of SMEs that are extremely flexible and respond quickly though under-capitalized and sensitive to market demand and highly integrated in the global economy (Low, 2006). Strategic alliance formation has been touted as one of the most critical strategic actions that SMEs must undertake for survival and success (Dickson *et al*, 2006).

In order to have a better understanding of SMEs, a brief knowledge of the Characteristics of SMEs is a must; the major characteristics of SMEs are listed below (Schatz, 2006, p. 3):

- SMEs are strongly owner-manager driven. Much of the time of the decision maker is spent on doing routine tasks. In many cases, they are family run.
- SMEs are driven by the demand for improving productivity, cutting costs and ever decreasing life-cycle phases.
- SMEs do not have extensive processes or structures. They are run by one individual or a small team, who take decisions on a short time horizon.
- SMEs are generally more flexible, and can quickly adapt the way they do their work around a better solution.
- SME’s entrepreneurs are generally "all-rounders" with basic knowledge in many areas. They are good at multi-tasking.
- SMEs are more people than process-dependent. There are specific individuals who do certain tasks, with experience and knowledge enable them to do so.
- SMEs are often less sophisticated, since it is much harder for them to recruit and retain technology professionals.

- SMEs focus more on medium-term survival than long-term profits.
- SMEs do not focus on efficiencies. They end up wasting a lot of time and hence money on general and administrative expenses.
- SMEs are time-pressured and therefore they want a solid relationship they can count on for top-quality service. They reward that with loyalty and repeat business.
- SMEs want a solution, not a particular machine or service.
- SMEs focus on gaining instant gratification with technology solutions. They must be simple to use, easy to deploy, and provide clear tangible benefits.
- SMEs do not necessarily need to have the "latest and greatest" technology. The solution can use "lag technology", for example one generation old, so it becomes cheaper to obtain and to use.

The importance of SMEs

Small and Medium Enterprises (SMEs) play an important role to promote economic growth, employment opportunities, and technology transfer. (Acs *et al*, 1997) argued that small firms are indeed the engines of global economic growth. SMEs also serve as the key engine behind equalizing income disparity among workers (Choi, 2003). In most countries, SMEs dominate the industrial and commercial infrastructure (Deros *et al*, 2006). More importantly SMEs play an important role in foreign direct investment (FDI) (Kuo and Li, 2003). Many economists believe that the wealth of nations and the growth of their economies strongly dependent upon their SMEs' performance (Schröder, 2006). In many developed and developing countries (such as Korea, Japan), SMEs are the unsung heroes that bring stability to the national economy. They help buffer the shocks that come with the boom and bust of economic cycles. China's recent rapid growth is linked to the emergence of many new small firms in village townships and in coastal areas, often in new industries (Acs *et al*, 1997). However, SMEs in the beginning of R&D activities always face capital shortage and need technological assistance.

SME Networkability

SMEs seem to be the appropriate units to behave like network nodes because of their lean structure, adaptability to market evolution, active involvement of versatile human resources, ability to establish sub-contracting relations and good technological level of their products (Mezgar *et al*, 2000). In light of the above, SMEs have advantages in terms of flexibility, reaction time, and innovation capacity that make them central actors in new economies (Raymond and Croteau, 2006).

From the human resources point of view, SMEs employees are given the authority and responsibility in their own work areas that can create cohesion and enhance common purposes amongst the workforce to ensure that a job is well done (Deros *et al*, 2006). In order to implement an appropriate knowledge management strategy in SMEs, cultural, behavioral, and organizational issues need to be tackled before even considering technical issues (Nunes *et al*,

2006). (Acs *et al*, 1997) further argue that the international diffusion of SMEs innovations is important for global economic welfare. Generally speaking three types of technologies are picked up by SMEs: small scale technologies, labor intensive technologies, and specialized high technology know-how (Acs and Preston, 1997) creating networks in the cycle of the management of these technologies is of a high importance.

The SMEs are corner stone in the industrial structure. Small manufacturing businesses are critical to most national economies. Not only do they directly provide a major component of manufactured output, but also they scatter the essential seeds from which larger business grows. (Johansson, 2002) argues in the same way and states that SMEs are not usually a major source of economic trade but contribute in three other ways:

- Small firms act as suppliers to larger multinational firms in the area.
- New small firms constitute the seedbed from which larger export oriented domestic companies grow and emerge.
- The sales and market share which new small firms hold on local markets act as substitutes for potential imports, thus contributing to the strength of the local economy.

Small firms are different from that of larger. Among the advantages the SME have:

- Little bureaucracy.
- Rapid decision-making.
- Motivated and committed management.
- Capable of fast learning and adapting routines and strategy.

SMEs in Development Network

Today, the picture of a stand-alone company that is linked to its customer and suppliers only by delivery and procurement of products is not longer valid (Wiendahl, 2002). Supplier involvement in product development is generally regarded as a strategic benefit to product development time, cost and quality. This is a typical description of SMEs where products are developed and produced in the development networks and where the involvement of the supplier or toolmaker can range from an independent realization of a set of specifications to the direct integration into the product development team. There is a tendency where some companies would prefer to collaborate with other companies rather than invest into a resource that might be scarcely used when the development activities end (Huang and Wu, 2003). There are several motives for building development networks. The market is getting more competitive, and because of that products are becoming too complex to be handled by a single organization. In addition, it is widely accepted that product development needs a concurrent approach with multi-disciplinary activities through the newest available technology, such as a digital factory. But since an increased number of newer technologies are available companies are often not able to invest on technology for the development of needed experts in-house. Outsourcing philosophies have forced the companies since the 1990's to concentrate on their core competences (Chase *et al*, 1998). As a consequence suppliers gained more and more responsibility in their customer's product technology and especially in product development (Maffin and Braiden, 2001). Such suppliers no longer compete for orders based on cheap labor, but with advanced engineering skills, equipment and short lead times to the customer (Chang and Chung, 2002). Therefore, suppliers have a strong impact on product as well as production development times and efficiency. All in all supplier and customer seek a stable and "win-win" relationship, which often results in long-term and hierarchic relationships with the supplier.

Conclusion

SMEs could be the key players in innovation processes and the economy of a country. Despite their size limits they can bring about a lot of creativity into the products and services they offer through research and development. Therefore, networking of a system seems to be a suitable strategic solution for technology based enterprises. This is to award them a competitive edge and opportunities to tap into the knowledge-base of other networked partners.

An internal cooperation is influencing the success of external cooperation by bridging between them into a coordination mechanism. Managers need to include internal cooperation in the design of the firm's external interfaces. SMEs in general seem to have great potential to adapt new methods but also have different needs and prerequisites than larger companies regarding adaptation of new methods. The gap between large organizations and SMEs is closing and the pattern of winning in the market space is changing due to technological advances. Competitive advantage, which once belonged exclusively to the large firms, can be made available to SMEs through geographically open boundaries created by the network. Therefore networking for SMEs is not a choice but a necessity. Creation of a network of SMEs that are perhaps geographically dispersed but virtually linked so that the participating members focus on their specialized tasks yet also share their knowledge and experiences and definitely serve to create an agile structured and flexible enterprise.

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